


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		011-752454 F			
						Issued		2014-12-19			
Company holding the		HELIONAL solar systems				Country		Greece			
Brand (optional)		--				Website		www.helional.com			
Street, street number		Oreokastro Industrial Park, P.O. Box 89				E-mail		info@helional.com			
Postal Code / City, province		57013 Thessaloniki		Tel/Fax		30 2310783691					
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Flat plate collector - glazed					
Thermal / photo voltaic hybrid collector? (PVT collector)						No					
Integration in the roof possible ? (manufacturers declaration)						No					
Collector name	Aperture area (Aa) m ²	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m ²	Power output per collector module					
						G = 1000 W/m ²					
						Tm-Ta					
						0 K	10 K	30 K	50 K	70 K	
						W	W	W	W	W	
FPS+ 1.5	1.33	1,480	980	115	1.45	1,004	950	831	697	548	
FPS+ 2.0	1.78	1,980	980	115	1.94	1,344	1,272	1,112	932	733	
FPS+ 2.4	2.17	1,979	1,185	115	2.35	1,638	1,550	1,356	1,137	893	
Performance test method						Glazed liquid heating collector - steady state - indoor					
Performance parameters related to aperture						η_0	a1	a2			
Units						-	W/(m ² K)	W/(m ² K ²)			
Test results - Flow rate and fluid see note 1						0.755	3.924	0.014			
Bi-directional incidence angle		No		<i>Kθ values are obligatory for 50°.</i>							
Incidence angle modifiers K θ (θ)		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
		K θ (θ)					0.85				0.00
Incidence angle modifier not bi-directional - leave fields blank											
Stagnation temperature - Weather conditions see note 2						Tstg	216.6 °C				
Effective thermal capacity						ceff = C/Ag	7.14 kJ/(m ² K)				
Max. intended operation temperature - see note 3						Tmax,op	200 °C				
Max. operation pressure - see note 3						pmax,op	1000 kPa				
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m ² aperture area											
Flow rate	kg/(s m ²)	0.000	0.012	0.027	0.040	0.055	0.070				
Pressure drop, ΔP	Pa	0	21	54	88	132	182				
Optional weather data		Location			Link						
Testing Laboratory		Fundación CENER-CIEMAT, LEST									
Website		www.cener.com									
Test report id. number		30.2429.0-1-1 30.2429.0-2-1 30.2429.0-3-1 30.2429.0				Date of test report		2014/12/17			
During the test GDIF/GTOT was always between		0.2	and	0.21							
Comments of testing laboratory:											
The collectors models FPS+ 1.5 and FPS+ 2.4 were tested according to ISO 9806:2013. According to SKM rules the results of the collector model FPS+ 1.5 are representative for the whole FPS+ family.											
Note 1	Flow rate	0.020 kg/(s m ²)	Fluid	Water							
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, Ta=30 °C										
Note 3	Given by manufacturer										
						 Datasheet version: 4.06, 2014-01-15					
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Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2454 F
	Issued	19/12/2014

Annual collector output kWh/module												
Collector name	Location and collector temperature (Tm)											
	Athens			Davos			Stockholm			Würzburg		
	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
FPS+ 1.5	1,473	991	602	1,096	719	418	805	501	284	873	534	296
FPS+ 2.0	1,971	1,326	805	1,466	963	560	1,077	670	380	1,168	714	397
FPS+ 2.4	2,403	1,616	982	1,788	1,174	683	1,313	817	464	1,424	871	483

Collector mounting: Fixed or tracking Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations				
Location	Latitude °	Gtot kWh/m ²	Ta °C	Collector orientation or tracking mode
Athens	38	1,765	18.5	South, 25°
Davos	47	1,714	3.2	South, 30°
Stockholm	59	1,166	7.5	South, 45°
Würzburg	50	1,244	9.0	South, 35°

Gtot	Annual total irradiation on collector plane	kWh/m ²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.